

**WHAT IS CLAIMED IS:**

1. A semiconductor device manufacturing system, comprising:  
a processing subsystem including:  
a process chamber; and  
a thermal control subsystem having a processing subsystem heating element and configured to generate a process chamber temperature profile; and  
a compensation thermal subsystem, including:  
a temperature sensor configured to detect the process chamber temperature profile;  
a compensation thermal control unit (CTCU) configured to determine variation between the process chamber temperature profile and a desired temperature profile; and  
a compensation heating element configured to alter the process chamber temperature profile in response to the variation detected by the CTCU.
2. The system of claim 1 wherein the compensation heating element comprises a plurality of compensation heating elements.
3. The system of claim 1 wherein the compensation heating element comprises a heat lamp bulb.
4. The system of claim 1 wherein the compensation heating element comprises an infrared energy source.
5. The system of claim 1 wherein the compensation heating element comprises a laser.
6. The system of claim 1 wherein the compensation heating element comprises heater wire.
7. The system of claim 1 wherein the temperature sensor comprises a plurality of temperature sensors.

8. The system of claim 1 wherein the temperature sensor comprises an infrared sensor.
9. The system of claim 1 wherein the temperature sensor comprises a thermistor.
10. The system of claim 1 wherein the temperature sensor comprises a thermocouple.
11. The system of claim 1 wherein the process chamber temperature profile is detected as a function of time.
12. The system of claim 1 wherein compensation heating element is configured to alter the process chamber temperature profile by adjusting power delivered to the compensation heating element.
13. The system of claim 12 wherein the power is proportional to a quantitative difference between the process chamber temperature profile and the desired temperature profile.
14. The system of claim 12 wherein the power is related to a mathematical integral of the quantitative difference between the process chamber temperature profile and the desired temperature profile with respect to time.
15. The system of claim 12 wherein the power is related to a mathematical derivative of the quantitative difference between the process chamber temperature profile and the desired temperature profile with respect to time.
16. A compensation thermal subsystem for use with a process chamber and a thermal control subsystem within a semiconductor device manufacturing system, the thermal control subsystem having a processing subsystem heating element configured to generate a process chamber temperature profile, the compensation thermal subsystem comprising:
  - a temperature sensor configured to detect the process chamber temperature profile;

a compensation thermal control unit (CTCU) configured to determine variation between the process chamber temperature profile and a desired temperature profile; and

a compensation heating element configured to alter the process chamber temperature profile in response to the variation detected by the CTCU.

17. A method of correcting variation between a desired temperature profile and a process chamber temperature profile generated in a process chamber by a processing subsystem heating element integral to a processing subsystem thermal control subsystem within a semiconductor device manufacturing system, comprising:

detecting the process chamber temperature profile;

determining a variation between the process chamber temperature profile and the desired temperature profile; and

adjusting power delivered to a compensation heating element based on the variation.

18. The method of claim 17 wherein the power is proportional to a quantitative difference between the process chamber temperature profile and the desired temperature profile.

19. The method of claim 17 wherein the power is related to a mathematical integral of the quantitative difference between the process chamber temperature profile and the desired temperature profile with respect to time.

20. The method of claim 17 wherein the power is related to a mathematical derivative of the quantitative difference between the process chamber temperature profile and the desired temperature profile with respect to time.